

WE CLAIM:

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C1-1. A chair comprising: a frame having a series of grasping members located around a circumference of the frame and a fabric; wherein said series of grasping members secure said fabric to said frame, said fabric providing a body support surface exposed to the user.

2. The chair according to Claim 1 wherein said grasping members comprise teeth extending upward from said frame.

3. The chair according to Claim 2 wherein said grasping members comprise a rounded top and a base.

4. The chair according to Claim 2 wherein said grasping members comprise an undercut area along an outside of said grasping members.

5. The chair according to Claim 1 wherein said fabric comprises holes that said grasping members protrude through thereby securing said fabric to said frame.

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C2-6. The chair according to Claim 5 wherein said fabric is a knit fabric with interlocked threads.

7. The chair according to Claim 6 wherein said fabric comprises lateral elastomer threads and longitudinal polyester threads.

8. The chair according to Claim 1 further comprising a cover installed onto said frame and over said grasping members.

9. The chair according to Claim 8 wherein said cover is flexible thereby allowing the cover to be installed onto said frame by flexing the cover onto the frame.

10. The chair according to Claim 1 wherein said frame comprises a retention slot comprising a first hole that is larger than a head of a pin and a second hole that is smaller than said head.

11. The chair according to Claim 10 wherein said retention slot further comprises a retention pad between said first hole and said second hole that retains a shaft of said pin within said second hole.

12. The chair according to Claim 10 wherein said retention slot further comprises a retention tab that prevents longitudinal movement of said pin when said pin is installed in said second hole.

13. The chair according to Claim 10 further comprising a chair frame with holes receiving a shaft of said pin and a tinnerman nut pressed onto an end of said pin shaft thereby attaching said frame to said chair frame.

Sub CB 14. The chair according to Claim 1 wherein said frame further comprises a raised ridge disposed along an inner circumference of said series of grasping members and a recessed channel disposed between said raised ridge and said series of grasping members that extends to a base of the grasping members.

15. The chair according to Claim 1 wherein said grasping members comprise teeth extending from said frame, said grasping members comprise an undercut area along an outside of said grasping members, said fabric comprises holes that said grasping members protrude through thereby securing said fabric to said frame, and said fabric is a knit fabric with interlocked threads.

Sub 16. The chair according to Claim 15 wherein said grasping members comprise a rounded top and a base, said fabric comprises lateral elastomer threads and longitudinal polyester threads, said frame comprises a raised ridge disposed along an inner circumference of said series of grasping members, and said frame comprises a recessed channel disposed between said raised ridge and said series of grasping members that extends to a base of the grasping members.

17. The chair according to Claim 15 further comprising a cover which is flexible thereby allowing said cover to be installed onto said frame by flexing the cover onto the frame.

18. The chair according to Claim 17 wherein said frame comprises a retention slot comprising a first hole that is larger than a head of a pin and a second hole that is smaller than said head, said chair further comprises a chair frame with holes receiving a shaft of said pin, and said chair further comprising a tinnerman nut pressed onto an end of said pin shaft thereby attaching said frame to said chair frame.

19. A method of manufacturing a body support surface for a chair comprising: supporting a frame having a series of teeth disposed around a circumference of the frame and pressing a fabric onto said frame wherein said series of teeth protrude through the fabric.

20. The method according to Claim 19 further comprising stretching said fabric during said pressing wherein said series of teeth secure the fabric to said frame in a stretched state.

21. The method according to Claim 20 wherein said stretching comprises stretching in a lateral direction and a longitudinal direction.

22. The method according to Claim 21 wherein said stretching comprises stretching said fabric about 6% to 8% in said lateral direction and stretching the fabric about 4% in said longitudinal direction.

23. The method according to Claim 21 wherein said stretching comprises stretching said fabric about 10% along the front side of said lateral direction, stretching the fabric about 6% along the rear side of the lateral direction, and stretching the fabric about 4% in said longitudinal direction.

24. The method according to Claim 20 wherein said stretching is achieved by applying a pressure to a tensioning cylinder determined from experimental tests.

25. The method according to Claim 19 further comprising pre-stretching said fabric before said pressing.

26. The method according to Claim 25 wherein said pre-stretching comprises stretching said fabric about 20% in a lateral direction and about 10% in a longitudinal direction.

27. The method according to Claim 19 further comprising aligning said fabric with said frame by shining a laser beam onto said fabric and aligning threads in the fabric with the beam.

28. The method according to Claim 19 further comprising pressing said frame into said fabric.

29. The method according to Claim 19 further comprising pressing said fabric along an inner circumference of said series of teeth towards a base of the teeth.

30. The method according to Claim 19 further comprising moving said fabric along an outer circumference of said series of teeth towards said teeth so that the fabric is pulled towards a base of the teeth.

31. The method according to Claim 19 further comprising reciprocating said frame against said fabric while the fabric is pulled along an outer circumference of said series of teeth but without pressing the fabric along an inner circumference of the series of teeth.

32. The method according to Claim 19 further comprising trimming an excess fabric along an outer circumference of said series of teeth and installing a cover over said teeth and said trimmed fabric.

33. The method according to Claim 19 further comprising pre-stretching said fabric before said pressing, stretching said fabric during said pressing wherein said series of teeth secure the fabric to said frame in a stretched state, pressing said fabric along an inner circumference of said series of teeth towards a base of the teeth, and moving said fabric

along an outer circumference of said series of teeth towards said teeth so that the fabric is pulled towards said base of the teeth.

34. The method according to Claim 33 wherein said stretching comprises stretching in a lateral direction and a longitudinal direction, further comprising pressing said frame into said fabric, and further comprising reciprocating said frame against said fabric while the fabric is pulled along said outer circumference of said series of teeth but without pressing the fabric along said inner circumference of the series of teeth.

35. The method according to Claim 34 wherein said stretching is achieved by applying a pressure to a tensioning cylinder determined from experimental tests, said stretching comprises stretching said fabric about 6% to 8% in said lateral direction and stretching the fabric about 4% in said longitudinal direction, and said pre-stretching comprises stretching said fabric about 20% in a lateral direction and about 10% in a longitudinal direction.

36. The method according to Claim 34 further comprising aligning said fabric with said frame by shining a laser beam onto said fabric and aligning threads in the fabric with the beam, trimming an excess fabric along said outer circumference of said series of teeth, and installing a cover over said teeth and said trimmed fabric.

37. A machine for manufacturing a body support surface for a chair comprising: a support for a frame and a first set of opposing clamps capable of grasping and stretching a fabric, wherein said support and said first set of opposing clamps are moveable with respect to each other thereby being capable of pressing said stretched fabric against said frame.

38. The machine according to Claim 37 wherein said support comprises urethane having a shape adapted to match an exterior surface of said frame.

FOOTNOTES

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39. The machine according to Claim 38 wherein said support comprises locators capable of further positioning said frame by contacting an interior surface of the frame.

5 40. The machine according to Claim 37 further comprising a second set of opposing clamps capable of grasping and stretching said fabric, wherein said second set of opposing clamps are positioned transverse to said first set of opposing clamps.

10 41. The machine according to Claim 37 wherein at least one clamp of said first set of opposing clamps comprises a first tensioning cylinder connected to a first side of said clamp, a second tensioning cylinder connected to a second side of said clamp, and a base connected to said clamp capable of translating and rotating.

15 42. The machine according to Claim 37 wherein each of said first set of opposing clamps comprises a clamping pin capable of securing said fabric extending from one face of the clamp.

43. The machine according to Claim 42 further comprising a laser beam capable of being shined onto said fabric and said clamping pins thereby allowing said fabric to be aligned and secured to the clamping pins.

20 44. The machine according to Claim 37 further comprising a laser beam capable of being shined onto said fabric.

25 45. The machine according to Claim 37 further comprising a pressing member capable of pressing said fabric against said frame, wherein said pressing member is positioned on an opposite side of the fabric from said support.

46. The machine according to Claim 45 wherein said pressing member comprises a blade capable of pressing said fabric along an inner circumference of a series of teeth located on said frame.

47. The machine according to Claim 37 further comprising a guide member capable of pulling said fabric against said frame, wherein said guide member is positioned around an outer circumference of the frame.

5 48. The machine according to Claim 47 wherein said guide member is positioned on an opposite side of said fabric from said support, said guide member is attached to one of said first and second set of opposing clamps, and said guide member comprises a shape like a portion of said outer circumference of said frame.

10 49. The machine according to Claim 37 further comprising a moveable base capable of moving said support and said first and second set of opposing clamps between a first station where said frame and said fabric are loaded and a second station where the fabric is pressed against the frame.

15 50. The machine according to Claim 37 further comprising a second set of opposing clamps capable of grasping and stretching said fabric wherein said second set of opposing clamps are positioned transverse to said first set of opposing clamps, a pressing member capable of pressing said fabric against said frame wherein said pressing member is positioned on an opposite side of the fabric from said support, and a guide member capable of pulling said fabric against said frame wherein said guide member is positioned around an outer circumference of the frame.

20 51. The machine according to Claim 50 wherein said pressing member comprises a blade capable of pressing said fabric along an inner circumference of a series of teeth located on said frame, said guide member is positioned on an opposite side of said fabric from said support, said guide member is attached to one of said first and second set of opposing clamps, and said guide member comprises a shape like a portion of said outer circumference of said frame.

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52. The machine according to Claim 50 wherein at least one clamp of said first and second set of opposing clamps comprises a first tensioning cylinder connected to a first side of said clamp, a second tensioning cylinder connected to a second side of said clamp, and a base connected to said clamp capable of translating and rotating.

53. The machine according to Claim 50 further comprising a set of clamping pins capable of securing said fabric extending from corresponding faces of said first set of opposing clamps and a laser beam capable of being shined onto said fabric and said clamping pins thereby allowing said fabric to be aligned and secured to the clamping pins.

54. The machine according to Claim 50 wherein said support comprises urethane having a shape adapted to match an exterior surface of said frame, said support comprises locators capable of further positioning said frame by contacting an interior surface of the frame, and said support and said first and second set of opposing clamps are attached to a moveable base capable of moving between a first station where said frame and said fabric are loaded and a second station where the fabric is pressed against the frame.